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***I-15 CORRIDOR  
RECONSTRUCTION  
PROJECT  
DESIGN/BUILD  
EVALUATION  
2001 ANNUAL REPORT***

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## UDOT RESEARCH & DEVELOPMENT REPORT ABSTRACT

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<b>16. Abstract</b> <p>This report is the fourth annual report to be produced under a four-year project of evaluation and research into the I-15 design/build project. The Research Division of UDOT commenced this research project as partial fulfillment of the commitments made to the Federal Highway Administration (FHWA) when design/build was permitted for this project. The project was designated as a Special Experimental Project (SEP-14) project. The purpose of the evaluation is to collect and evaluate information derived from the process used in this project and provide this information to other agencies or entities interested in pursuing similar design/build projects in transportation.</p> <p>This report covers four areas of investigation.</p> <p>The areas covered by this report include an evaluation of use of performance specifications, a third follow up of the QA/QC program established by UDOT for the construction portions of the project, a second review of the innovative design and construction methods used on the project, and an assessment of partnering on the project.</p>					
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**I-15 CORRIDOR RECONSTRUCTION PROJECT  
SPECIAL EXPERIMENTAL PROJECT 14  
2001 ANNUAL REPORT**

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# **I-15 CORRIDOR RECONSTRUCTION PROJECT SPECIAL EXPERIMENTAL PROJECT 14 2001 REPORT**

## **INTRODUCTION**

On April 15, 1996, the Utah Department of Transportation (UDOT) requested approval from the Federal Highway Administration (FHWA) to use design/build for the I-15 Corridor Reconstruction Project under the provisions of Special Experimental Project 14 (SEP 14). April 15, 1997, UDOT issued a Notice to Proceed (NTP) to Wasatch Constructors to design and construct the project. Wasatch Constructor's design/build proposal for the base price plus construction and maintenance options were \$1.352 billion, making this the largest single highway contract (traditional or design/build) in the country.

An initial report prepared by UDOT titled "Design/Build Contracting Initial Report" covered the 14 month period from the middle of February 1996 to the April 15, 1997 NTP and described the acquisition strategy process (deciding on the type of design/build), the steps in the process, the development of the Request for Proposal (RFP), and the evaluation and selection of the successful proposer. A copy of the report is available from the UDOT Research Division

The 1998 report covered three areas of investigation. The first was a more detailed presentation of the selection process used by UDOT to select the contractor. This section was prepared as a separate white paper and submitted to the Transportation Research Board and published in 1999. The other two areas covered by this report were evaluations of the design process used by Wasatch Constructors and the QC/QA program established by them for both the design and construction portions of the project.

The 1999 report covered three topics: design process, quality control/quality assurance, and innovative construction methods. This report was published in March 2000 by the UDOT Research Division and is available from them.

The 2000 report covered three topics: performance specifications, innovative construction methods and QC/QA program. This report was published in June 2001 by the UDOT Research Division and is available from them. All prior reports on this project have been placed on a UDOT web page and are available via the Internet.

This annual report contains the last year's review of the project and includes chapters covering the QC/QA process, innovation construction methods, the use of performance specifications and the partnering process used on the project.

## **SCOPE OF EVALUATIONS**

This report is the last annual report to be produced under a four-year project of evaluation and research into the I-15 design/build project. The Research Division of UDOT commenced this research project as partial fulfillment of the commitments made to the Federal Highway Administration (FHWA) when design/build was permitted for this project. The purpose of the evaluation is to collect and evaluate information derived from the process used in this project and provide this information to other agencies or entities interested in pursuing similar design/build projects in transportation.

## **AUTHORS AND CONTRIBUTORS**

The 2001 report was written based upon a series of interviews conducted with a number of individuals both within the I-15 UDOT Team and the Wasatch Constructors design and construction teams. The innovative construction methods were developed by a team of evaluator's led by Stan Postma, Project Manager. The team consisted of Jim Roberts, Deputy Director of CalTrans; and Richard Wilkison, Senior Structural Engineer, Carter & Burgess.

Stan Postma and Dennis Anderson, each senior project managers with Carter & Burgess, and Jim Roberts, Chief Deputy Director of CalTrans, prepared the report on quality control/quality assurance. Stan Postma and Roger Cisneros of Carter & Burgess prepared the use of performance specifications report. Stan Postma, Richard Wilkison, Al Eastwood and Jeff Clevenger of Carter & Burgess completed the reports covering the partnering process and QA/QC process.

Several Carter & Burgess staff and various UDOT staff conducted reviews of the reports.

# **CHAPTER 1**

## **THE USE OF PERFORMANCE SPECIFICATIONS I-15 DESIGN/BUILD PROJECT**

### **INTRODUCTION**

As part of the evaluation of the I-15 Design/Build Project, Utah Department of Transportation wanted to evaluate the use of performance specifications on the project. UDOT did not have much experience with performance specifications on projects so the use was relatively new to the Department.

This report is a follow-up evaluation of the performance specifications used on the I-15 Design/Build Project. A more detailed report (2000 Annual Report, UT-01.08) was prepared in 2000 that discussed in detail the development and use of performance specifications on this project. This report contains a follow-up on that report and observations made by project personnel and the evaluation team not contained in the earlier report. This second and final evaluation is intended to document any new or additional observations since the last report was completed.

This final evaluation was made after the facility was opened for traffic (June 2001) and the Contractor was completing smaller elements of the project prior to final acceptance of the project by UDOT. Many of the key project personnel had already left the project. Therefore, the evaluation team was limited in the number of project people available for interviews.

The reader is referred to the 2000 Annual Report for a more extensive discussion of performance specifications, UDOT's process in the development and implementation of the specifications, as well as the evaluation of the performance specifications.

### **INTERVIEWS**

The interviews for the initial evaluation were conducted in December 2000. At that time, all the performance specifications, with the exception of the Maintenance After Construction (MAC) specification, had been extensively used and evaluated. The MAC specification was in the process of being reviewed and compared to the Contractor's required Maintenance Plan. After this review, UDOT was to decide whether or not to invoke the maintenance options included in the contract.

The evaluation team interviewed several people who had been associated with the project. Each was asked to offer final thoughts, or any new observations regarding the use of performance specifications on the project. These discussions along with the decisions made on the Maintenance specifications are summarized below.

## EVALUATION OF THE SPECIFICATIONS

The initial report contains an extensive discussion of the types of specifications that were used on this project. They were classified into three broad areas, prescriptive, performance and hybrid. The following paragraphs discuss findings on some of the specifications not discussed in the initial report.

SIGNING Specification - This specification was considered to be prescriptive. UDOT used much of their standard specification to prepare this specification and most of it deals with the fabrication and materials used in preparing the signs used on the project. However, the specification provided the latitude in the development of the signing plan and the responsibility for the correctness and accuracy of the plans.

Some problems with the project's signing plans have become evident now that the facility is open to traffic. The plans and specifications were not very explicit about signing requirements on routes leading to I-15. The reconstruction of I-15 resulted in many changes that affected drivers. This included reconfiguration of the three major freeway-to-freeway interchanges and many ramp reconfigurations at interchanges with local roads. Upon opening the facility, it was observed that drivers were confused entering the project area. This was especially evident where the new facilities had changes in function or geometry from what existed before the construction, such as the west bound I-80 entrance onto I-15. It became apparent that additional advanced signing outside of the project limits was needed to inform the users of the changes. The Contractor and UDOT have placed additional signing outside of the project limits to provide the advanced notice to drivers.

On future projects the signing requirements outside the limits of the project need to be examined to insure that motorists are informed of the changes.

MAINTENANCE AFTER CONSTRUCTION Specification - During the development of the Design/Build RFP, UDOT believed that requiring the Contractor to be responsible for the performance and maintenance of his designs and construction would enhance the quality of the design and construction. It was believed that true performance specifications work best when the design/builder is involved in the long-term maintenance and operation of the project.

Originally, UDOT had intended to require an extended performance warranty that extended up to 20 years. Drafts of the specifications were released for comments to the three short-listed contractors during the RFP process. The three contractors expressed concerns that this long-term obligation was not feasible for them to provide to UDOT at a reasonable cost.

After careful consideration, UDOT modified the contract requirements to include up to ten years of maintenance by the Contractor of specific elements of the construction. The final RFP required the Contractor to provide a cost option to provide maintenance for the first five years and options for five one-year periods up to a total of ten years of maintenance. The terms of the contract provided an opportunity for UDOT to invoke the first five-year maintenance period requirement near the end of the construction phase. In addition, the five one-year contracts could be added annually if the initial five-year contract was chosen by UDOT.

The contract included provisions to adjust the actual cost of the maintenance provisions based upon the Federal-Aid-Highway Construction Urban (Composite) Index. UDOT was uncomfortable about adjusting the contractor's lump sum price using the Index because it had been very volatile during the term of the contract. After observing the volatility of this Index, UDOT was reluctant to proceed with the adjustment. UDOT recommended that a different index be used on future projects, if one was to be included, to address the time value of money issue. The contract also included provisions for sharing risk on cost overruns due to catastrophic problems not directly attributable to the Contractor or the quality of his construction. UDOT was not willing to take this risk.

The contractor's Maintenance Plan was contractually due on January 15, 2001. This plan detailed the maintenance effort that would be performed upon substantial completion of the project. UDOT was contractually obligated to exercise the MAC provisions by April 15, 2001. If UDOT elected to accept the proposal for maintenance a Maintenance Quality Management Plan (MQMP) would then be prepared by the contractor and submitted to UDOT. The purpose of the MQMP was to detail how and what quality programs the contractor would use in implementing the Maintenance Plan.

Upon thorough review of the MAC specifications, it became evident that an effective Maintenance Plan would be difficult to develop. The requirements for maintenance were spread throughout the contract, which made it difficult to identify and monitor. The specifications also had some ambiguities, which made it difficult to interpret the requirements and assure UDOT would get what they intended.

In addition, UDOT was very comfortable with the quality of the completed project and felt that they could perform the required maintenance more efficiently and at a lower cost with their normal maintenance program. Therefore, UDOT decided to not invoke the MAC provisions.



## **ADDITIONAL OBSERVATIONS**

There are several other observations that were evident as this evaluation was completed that are important to discuss. These observations are presented in the following paragraphs.

Design Task Force Meetings – During the design process UDOT and Wasatch used a design task force meeting process to provide direction and review to the design teams. Although the process was not a requirement of the contract, it proved to be an essential element in implementing performance specifications.

The flexibility in the specifications permitted the contractor to propose different options or solutions. The design task force process gave UDOT the opportunity to consider and approve or reject options presented by the Contractor in a timely and efficient manner. It also permitted UDOT the flexibility of adding expertise to their review team, as required, to consider and evaluate solutions or options proposed by the Contractor.

The consensus of those interviewed was that the design task force meetings were a “must” in making the performance specifications work on this project. The process gave opportunities for UDOT to “speak up” as problems were encountered or as solutions were proposed. It was characterized by some as “up-front” value engineering that provided for approvals of options or solutions early in the design phase where it could be most effective.

Partnering – The partnering process is discussed in depth in a separate section of this report. It is important to mention when considering performance specifications because of the role partnering played with their use. Because of the flexible nature of performance specifications, there are opportunities for the use of the partnering process when interpreting performance specifications. This process was used extensively on this project to further define the intent of the specifications. It was felt that partnering is important for any construction project, but particularly important when using the design/build process with performance specifications.

Allowed Flexibility – It was emphasized again, as it had been during the initial evaluation, that performance specifications should only be used where the Owner wants flexibility and creativity in the development of solutions. If a specific solution is wanted or preferred, then specifying it using prescriptive specifications is more appropriate.

One example cited by UDOT staff was the method used to wire the sensors for traffic control loop detectors. The specification was silent on whether the contractor would use parallel or series wiring configurations. Either configuration would satisfy the

requirements of the specification. However, UDOT's experience had indicated they had difficulty maintaining loops wired in a certain way. In this case it would have been better to eliminate the optional wiring methods because UDOT only wanted them wired one way.

New Products or Methods – On multi-year projects it is difficult to predict if there will be new products or processes developed that could benefit or improve the project. Performance specifications provide flexibility to permit these new technologies to be used. However when prescriptive specifications are used this flexibility is reduced and sometimes eliminated. To counter this, it was recommended by UDOT personnel that there should be a formal mechanism or process in place that permitted consideration for incorporating new standard plans and specifications (such as guardrail standards, impact attenuators, etc.) that are developed during the course of the project. Therefore, the project should not be denied the use of new technology or products simply because they were not in existing or approved at the time of initial contract execution.

Field Design Change – A field design change process was developed to handle plan changes during construction. This process is described in detail in the reports on QA/QC contained in the prior annual evaluations reports. It was indicated that using this process proved to be an essential element when using performance specifications. It permitted UDOT to remain informed regarding field changes and to determine whether proposed changes were still in conformance with the minimum requirements of the specifications.

## **LESSONS LEARNED**

The additional lessons learned during this evaluation are presented in this section.

Flexibility. Only permit flexibility where the Owner wants to permit the contractor/designer to have flexibility. If the Owner wants proven methods to be used then prescriptive specifications are more appropriate.

Outcome Expectations. Where the Owner can define a method to achieve a specific outcome, a prescriptive specification is more appropriate than a performance specification. As an example UDOT intended to have pavement be a performance specification but upon review and development of the specification so many prescriptions were added that the specification became a prescriptive specification.

Performance Measurement Criteria. A pure performance specification requires that specific performance criteria and measurement standards be included. This is difficult in highway construction because in many cases the appropriate time to measure performance is several years after construction is completed. Examples of this are settlement of structures and fill and smoothness of pavement after several

years of use. It demands that the writer anticipate many years into the future to establish appropriate performance and measurement criteria.

Design Task Force. The use of design task forces composed of Owner and Contractor staff has proven critical to interpret the intent of the specifications. On this project many of the authors of the specifications were included on the Task Forces further enhancing the ability to interpret the specifications at the design stage where it is most effective.

Maintenance After Construction. The Owner needs to take care in establishing the requirements of the specifications so that the outcome intended is fulfilled. The feasibility of requiring long term warranties or guarantees needs to be thoroughly evaluated if the Owner intends to use them. The use of cost indices to adjust for escalations in cost during long-term periods needs to be carefully evaluated to use indices that are appropriate for the use and are not excessively volatile.

Partnering. When using performance specifications, especially on a design/build project it is highly recommended that a partnering process be included as part of the project contract. This becomes especially important in interpreting the intent and meaning of the requirements.

Limits of Project. On similar projects where major road configurations are changing, consideration must be given to directional signing that will be required to reacquaint users to the new configurations. This may require that signs outside of the normal limits of a project will need to be placed.

Field Design Changes. A process for tracking field design changes is important on any construction project. It becomes more important on a design/build project where performance specifications have been used to enable the Owner to track changes that may have resulted to ensure that they continue to meet the intent of the contract.

Use of "Equal or Better." UDOT and the Contractor developed a Memorandum Of Understanding (MOU) that permitted the contractor to propose "equal or better" solutions on the project. This is discussed in detail in the 2000 annual report. Because this played such a key role in interpretation of performance specifications the reader is referred to that report for more details.

## **CHAPTER 2**

### **ANNUAL QC/QA PROGRAM REPORT FOR THE I-15 DESIGN/BUILD PROJECT 2001**

#### **INTRODUCTION**

This is the fourth in a series of annual reports on the QC/QA process being used on the I-15 Design/Build project. This report covers the period from July 2000 to July 2001. In addition to this report UDOT has published reports covering the selection process, the design process, performance specifications, innovative construction methods, partnering and public involvement. Annual reports are published which contain the results of the evaluations and a final report summarizing the entire project is scheduled for publication in 2002.

The I-15 project was started in April 1997 when the contract for the design/build services was awarded to Wasatch Constructors (Wasatch). The reports prepared in prior years presented discussions of the organization used in the first year of the contract, and an evaluation of the second and third year's performance. The QC/QA program was developed during the first year and certification under ISO 9001 was obtained during that period of time.

This report covers the fourth and last year of implementation of the QC/QA program by the contractor. At the time of the evaluation, August 2001, the construction has been essentially completed.

Two QC/QA programs were developed for the design/build project. The first was developed and used to monitor and control the design process. The second focused specifically on the construction activities. Reports were developed in 1998 and 1999, which describe the QC/QA program involved in the design process and the "over the shoulder" review process used by UDOT. The reader is referred to those reports for a discussion on the design QC/QA program.

#### **CHANGES TO QA/QC PROCESS IN 2001**

The Contractor modified their QA and QC program in 2001. In prior years, each segment had individual staff responsible for both QA and QC activities. As the project neared completion the of 3 segments were demobilized and a single project team was formed to oversee all concluding activities. UDOT's staff was also consolidated and reduced. UDOT and the Contractor downsized to match the volume of work remaining. At the time of the interview (August 2001) there were fewer than 150 people working on the project for the contractor. Most of the work was associated with cleanup activities required to finalize the project. All major work elements were completed. The target date for final completion was September 30, 2001.

UDOT continued to use ATSER (an independent testing firm) for independent verification testing on the project and used this information to correlate to the QC and QA reports generated by Wasatch. UDOT also continued using their region laboratory to monitor the Wasatch laboratory. UDOT used their laboratory to verify testing procedures and equipment used by Wasatch but they did not conduct independent verification tests. ATSER performed all independent verification tests for UDOT.

The evaluation team observed that there is a continued level of concern among the UDOT oversight and Wasatch staff with the QA role on the project. The Owner staff was somewhat concerned about the lack of independence of the QA staff from the Contractor. Our observations are that much of this discomfort stems from the cultural change that results from having the contractor provide the QA services.

UDOT modified the requirements for inspector certifications early in the construction process because there were not enough sufficiently qualified and certified inspectors available for the contractor to hire. Initially UDOT was requiring level IV certification by NICET. Over time this requirement was modified to accept level II certification for the same positions. UDOT anticipated that this may be a problem prior to award of the contract but decided to proceed with the expectation that inspectors would become certified at higher levels during the project. The lack of a large local pool of certified inspectors available for the project continued to be a problem for the Contractor throughout the construction period and was never fully satisfied. Also, only 2 of the 10 QC managers who worked on the project were licensed engineers. UDOT suspected that the Contractor did not want to put licensed personnel into those positions because of the potential liability associated with that role.

## **CONTRACTOR SUGGESTED IMPROVEMENTS**

The Contractor made several suggestions for future projects based upon the experience gained on this project. These should be considered for other projects and, where appropriate, could be incorporated into requirements.

The Contractor would like to see Quality Control placed within the Contractor's production level staff. Traditionally this is where the Contractor places this responsibility, requiring a higher acceptance level from production managers of control reports and personnel. On I-15 the Contractor felt that the QC role viewed by the Owner was a function independent from production, a more traditional role. The Owner interpreted the award fee as a means to assure this independence.

Quality Assurance should remain a function of the Owner. The Contractor recommended that he not be assigned this responsibility. This has traditionally been an Owner provided role and the Contractor would like to see this remain.

The Contractor indicated that the design/build team should perform acceptance testing, with input from the Owner. The Contractor felt that this should be separated from the QC role and independent of the production personnel.

The Contractor suggested that a financial incentive program might be more effective than the Award Fee program used on this project. The Contractor and Owner had very different understandings of the Award Fee program and its purpose. The Owner expected the program to result in increased attention to quality by the Contractor. The Contractor saw the program as part of their compensation package to be awarded if they were able to meet project goals.

## **OWNER SUGGESTED IMPROVEMENTS**

The contract required the Contractor to provide QC data to the Owner for use in statistical evaluations made of the data. However, there was no requirement to provide this data electronically therefore, some Wasatch segment managers insisted on providing this information via hard copy reports, making it more difficult and time consuming by UDOT to process and analyze the information. The Owner suggests making the exchange of this data electronically a contract requirement in the future to expedite the processes.

The Owner initially assigned most of their oversight staff to the design process. After the design was completed many of these personnel were shifted into a field support role in oversight of construction. The Owner field staff expressed a preference to have more design support earlier in the project. Because there were construction activities occurring simultaneously with the design, some of the fieldwork took place before the Owner field staff received much design support. The UDOT segment construction oversight managers felt that more design help earlier in the process would have proved beneficial and also recommended a similar structure for the Contractor. More field design support was viewed as a way to expedite field changes and accelerate the construction process. On this project the Contractor placed most of their design support in the central “Hub” location requiring frequent referrals for change review.

The Owner established procedures where field changes could be made without design input to help expedite the construction work. Normally any field change associated with design was referred back to the design engineers located in the central “Hub” office for input prior to approval of changes. Because this often slowed the process down, UDOT developed an informal acceptance process where changes of minor significance could be made without receiving formal designer approval. This was limited to minor changes such as the relocation of control boxes or similar features within certain limits. The Owner recommended a comparable process on other UDOT projects so that minor changes could occur without slowing the project yet maintaining acceptable tolerances on the design.

The Owner also suggested that their personnel could perform approvals of items fabricated for the project at shop locations. This is similar to historical practice, and was recommended

because UDOT felt that the Owner is more accustomed to performing this type of acceptance approval and has personnel already trained and certified to perform it where Contractors generally do not. On this project such inspections and acceptance may have reduced some problems encountered by the Contractor. The Contractor had indicated they had to establish a more rigorous QC program with some of their suppliers, especially with some pre-cast concrete items such as bridge girders and deck panels, because they were not able to rely upon the suppliers and subcontractors in the beginning to provide this. They ended up rejecting some materials and having them re-fabricated. Had UDOT provided this from the beginning some early problems with quality may have been avoided.

## **CULTURAL CHALLENGES**

The Owner felt that one of the biggest challenges to the QC and QA program was “breaking the mold” of the traditional roles of the contractor and Owner. The Owner’s personnel had all come from the “catch and punish” culture. Likewise the Contractor personnel came from a similar background. To change philosophies to a more proactive quality role by the Contractor and a less controlling oversight role of the Owner was a significant challenge. Most personnel assigned to the project by either party had worked under traditional systems for many years and this was the first experience with this type of project.

The Owner staff felt that they were only partially successful in overcoming this cultural change. It took more than a year to see a shift in the staff from either party. The project personnel became more comfortable with the new roles once they had positive experiences with them. However, there were individual cases where acceptance was never fully achieved. To a large degree the QC role was fully shifted to the Contractor with broad acceptance of this by Owner project personnel. This was especially true of the material testing functions of QC. The Owner relied extensively on statistical analysis of data to check performance of the testing role. The results of this analysis were consistently within the range expected and the confidence level was high among project personnel. The level and degree of inspection by Contractor personnel was less well accepted by the Owner’s staff. Again, this is viewed a result of the cultural change inspection by the Contractor represents. Although a shortage of experienced inspectors available to the Contractor contributed to this impression.

The changed QA role remained an issue throughout. As stated earlier in the report, the Contractor indicated they would prefer to see the Owner retain this role. The stated feeling was that the Owner has provided this role and it is difficult for the Contractor to assume this role. There is also an indication that Owner QA would aid the Owner in accepting the QC program and build confidence in the process.

Job security of Owner staff also became an issue to be dealt with. There were some individuals who felt a threat to their job when the QC role was given to the Contractor to execute. UDOT had to reassure these employees that they would continue to have a job, even if it was changed

from the historical practice. They also provided reassurance that not all projects would be executed using design/build processes and that traditional contracting methods would continue for many projects.

## CONCLUSIONS

The QC and QA programs are essential to the design and construction process. The Owner had more confidence in the QA/QC programs used for the design process than the construction process. The most significant problem encountered was the need to change the culture of each organization to accept this new process and assume the new roles associated with it. This was more difficult in the construction phase where a more adversarial relationship was the historic precedence. This challenge was a significant one and was not completely accomplished in this project.

Having the Contractor perform traditional Owner roles of inspection and assurance were the most difficult tasks to change. Material testing and reporting activities were more easily transferred to the Contractor and accepted by Owner staff. The lack of full acceptance by UDOT Staff of the inspection program was a problem seen throughout the construction period. UDOT management exerted considerable efforts to educate their staff and build trust in the process.

The use of an Award Fee as part of the QA/QC program was not entirely successful. The Owner and Contractor had dramatically different views of the Award Fee program and what it was intended to accomplish. This gap in understanding was never fully bridged and hence the effectiveness of the Award Fee on the QA/QC program was less than expected.

There was a perceived need to have more design support in the field during construction to review and evaluate field changes in a more expeditious manner. This was true of both the Owner and Contractor. UDOT received increased support as the design functions decreased and they were able to transfer design personnel to the field for support. The Contractor continued to use a centralized design review process, which slowed the review process, as time was required to send changes from the field to the office for consideration.



## CHAPTER 3

### INNOVATIVE DESIGN AND CONSTRUCTION METHODS ON THE I-15 DESIGN/BUILD PROJECT

#### GENERAL

This report is the third and final report in a series of evaluations of the use of innovative design and construction methods on the I-15 Design/Build project. The 1999 report detailed the methods considered to be unique to this project and new to UDOT. The 2000 report presented an assessment of the status of the use of these methods in the construction of the project and identified some areas of concern. This report summarizes the evaluation of the methods and designs used and benefits from having the project completed and accepted by the Owner. This report is intended to be a summary report and does not explore these methods in the detail contained in prior years annual reports.

**Overall Comments-**The UDOT staff generally was pleased and surprised with the number of new ideas, procedures and innovations proposed by the contractor. Many of these were not new to the construction industry but were new to UDOT. A large number of the innovations were identified during the design process so they occurred during the project's first two years. However, there were a number of innovations proposed during the construction phase.

The UDOT staff believed it would have been advantageous to have more experienced designers with field experience available during the construction phase to evaluate the proposals. They felt the designers would have helped both UDOT and Contractor to evaluate proposals if each had retained this type of staff. Many times UDOT and the Contractor had to assemble teams to review proposals and evaluate them and more experienced staff carrying over from the design phase may have expedited this process.

Both UDOT and the Contractor believed that the innovations resulted in savings to the contractor in both time and money. While the contractor used the innovative construction ideas extensively where it helped him, he did not provide as much encouragement to sub-contractors nor help them get ideas approved that assisted only their work.

Often UDOT did not consider the proposals as equal or better to the contract requirements so they were rejected. UDOT still had to evaluate each proposal and the review process often was very time consuming. It was recommended that a full time senior level staff engineer(s) be available to the Owner on future projects to handle the review and evaluation of proposed innovations. Overall UDOT and Wasatch each felt that this process worked quite well for both parties. Proposals were made by both the contractor and UDOT for consideration. However, most were proposed by the Contractor to accommodate his work.

Success of many innovations will depend on the next few years' performance. Many of the innovations will require that additional time pass before the outcome can be confirmed. This is especially true of many of the foundation and structural solutions that were used where performance over several years must be measured before the outcome is known.

## **SPECIFIC INNOVATIONS/PROCEDURES**

**Settlement issues**-One of the major design challenges was addressing settlement of the underlying foundation soils located along the corridor. This material has a history of settlement so special design details had to be developed to accelerate, prevent or limit settlement. One of the first innovations that the contractor attempted was the use of lime-cement columns to limit settlement. The construction of the columns was slow and expensive so the contractor changed to wick drains to accelerate settlement. At this point in time the drains have worked satisfactorily and UDOT is adopting their use on many other projects. Stone columns were also used successfully near river crossings.

**GeoFoam Walls**-Another innovation to limit settlement was the use of Geofoam blocks for embankment material. The blocks have approximately 10 percent of the weight of fill, thus reducing the load-induced settlement. This procedure is relatively new to the highway construction industry.

The original designs assumed that little or no settlement would occur internally within the block structure. However, in many cases settlement of several millimeters occurred within the blocks themselves, resulting in facing wall panel connectors shearing at the connection point with the geofoam fill. Corrective designs were required to remedy this situation. UDOT will continue to monitor these walls to measure long-term performance. It may be several more years before the performance of this system can be completely evaluated. However, they currently appear to be performing as expected.

**Two-stage MSE Walls**-The use of two-stage walls is another innovation. Single staged MSE walls are traditionally used where settlement is expected. The two-staged design, permitted initial settlement to occur before installing facing panels. These types of wall systems can adjust to settlement because of their modular construction and major settlement is permitted prior to erection of more rigid facing panels.

The walls are reinforced with metal grids embedded within the fills. To monitor the long-term performance of the metal grids, pullout sacrificial rods and inspection doors have been installed in the wall facing panels to enable monitoring of the internal wall performance. The two-stage wall provides for adjustment of the facing panel wall connectors if additional settlement does occur. There is an open space between the MSE layers and the facing panels, which allows the embankment and facing panels to settle independently of each other. There have not been any indications to date of system failure and performance is at or above the level expected.

**Deck Curing**-A new method for deck curing has evolved within the industry over the past few years but it was new to UDOT. This method uses burlin, a composite of burlap and plastic sheeting. UDOT had previously used only a wet cure method for bridge decks, etc., requiring sprinklers. With burlin the deck concrete is fogged with a curing compound, the inside layer of the burlin is soaked with water and no further water is applied. The plastic outer layer traps the moisture inside, on top of the concrete. This method was used successfully on this project. UDOT is considering making this method an acceptable procedure in their standard specifications used on all projects.

**Seismic Design**-After much debate and discussion the contractor's designers convinced UDOT that the California displacement based seismic design procedure was equal to or superior to the AASHTO specification for this project. This was one of the most significant innovations adopted by UDOT; it resulted in different substructure requirements and was judged to be a cost savings. A more detailed discussion of this is contained in the 1999 annual report.

**Pre-Cast Stay-in-Place Deck Panels**-The Contractor used pre-cast panels on all concrete girder structures. There were a large number of cracks in some of these panels, especially those fabricated in the earlier stages of the project. Two suppliers manufactured the panels and one experienced more problems than the other. It is perceived that the sub-contractor's handling and casting procedures caused the cracking problems. Most of these fabrication problems were remedied as the contractor instituted his own quality control program with suppliers. On some of the panels, the contractor drilled in dowels to increase the shear resistance where the roughened surface finish was not considered to be adequate.

Generally, Wasatch liked them because they expedited the forming and placement of decks. UDOT did not like the performance and are not currently considering permitting the use of this method on other projects. Their major concern has been with the cracking in the pre-cast panels and whether that will result in long-term problems. UDOT is continuing to monitor the performance of these panels on the project.

**Transverse Post-tensioned decks**-On a large number of the steel girder bridges the girder spacing was increased to eliminate a girder line. To compensate for the wider girder spacing, the decks were post-tensioned transversely. On bridges constructed early in the project many of the decks experienced transverse cracking. There has been some concern expressed by UDOT staff about the number of cracks found in these decks. Another issue is how to replace a deck that is transversely post-tensioned, without closing the bridge to traffic. A requirement of the design was to provide a replaceable deck design. UDOT has not been totally satisfied that decks can be replaced successfully but has accepted the structures as designed.

**Deck Cracking**-On several bridges, primarily those constructed early in the project, deck cracking was observed after they were opened to traffic. Micro-silica fume was used in the deck concrete and in the first year decks were placed during summer daylight times

when temperatures were high. After the first year decks were placed at night when temperatures were cooler and wind was not high. Originally, Wasatch expressed a feeling that the cracks were caused by design criteria that encouraged the reduction of joints in the bridges.

When the problems were first identified, Wasatch took the position that this was a normal result of the design criteria. Therefore, they were reluctant to even seal the cracks. In the last year and after several discussions with UDOT a change of philosophy with Wasatch resulted in a new direction. Wasatch did seal the cracks with merthacolate and installed a poly-carbon overlay on several decks where cracking was considered an issue. UDOT has initiated an active bridge maintenance program to monitor this issue on this project and consider remedial measures if necessary. Not enough time has passed to determine whether this remedy will be sufficient.

**Spliced Girders**-For longer spans of Bulb-T pre-stressed concrete girders the girders were fabricated and delivered in shorter pieces, erected on temporary supports and post tensioned to form one long span. These were designed as composite with the deck and deck replacement could be a future problem due to the post-tensioning of the girders. The spliced girders were post-tensioned after the deck concrete was placed. UDOT is developing a plan to be used in the event that a deck requires replacement.

The girders were cast integral into the abutments. This process has worked well and no problems have become evident with this method of construction.

**Deck Grinding, Clearance Problems**-Near the end of the project bridge decks were being ground to achieve the roughness coefficient and the smoothness criteria required in the project. On some decks the reinforcing steel was either exposed or concrete cover reduced below acceptable levels and remedial work was needed to replace the concrete cover. A Hilti ferroskan machine was used to scan suspect decks and determine concrete cover on reinforcement. This system worked very well and UDOT developed a high degree of confidence in the ferroskan system.

The specification for concrete cover in the contract was 50 mm (2 inches). UDOT permitted a minimum of 41 mm of cover as a construction tolerance. As a result of the review using the scanning machine between 20 and 30 bridge decks were found to have insufficient reinforcement cover and had remedial work done. The contractor placed poly-carbon and sand overlays over some of the areas to provide additional protection. Five decks had to be jack hammered and rebar lowered to provide sufficient clearance. This repair work was done on weekends when decks could be closed. In the future a larger minimum concrete cover should be considered where grinding of decks is anticipated.

## CONCLUSIONS

The use of innovative methods for design and construction was considered to be a success on this project. The short construction time frame required to contributed to the use of several methods to control or accelerate settlement of foundations. The use of wick drains, stone columns, two-staged MSE walls and Geofoam fill each contributed to the success of the project. Each method has performed well under the conditions of this project. UDOT is continuing to conduct long-term testing and monitoring programs to document results of the use of these techniques on the project. Interested agencies who wish to consider the use of similar methods on projects should contact UDOT Research Division as the results of these longer term studies become know to obtain information not currently available.

UDOT had expected that more innovative designs would be proposed for structure designs. However, because of the short time frame permitted for construction, the Contractor elected to use more traditional methods, with the exceptions of spliced girders and post-tensioned decks. It is expected that on a project where time is less critical, more innovations would be considered.

Many of the techniques first used in Utah on this project are gaining acceptance by UDOT for other projects. Wick drains are one example where performance has been very good and UDOT is using similar techniques on several other projects. The use of burlin for concrete deck curing is also becoming an accepted practice by UDOT. It is expected that many other methods will also gain wider use by UDOT as the circumstances warrant. This introduction of new methods to UDOT personnel has been a very positive outcome of the project.

To adequately evaluate the use of innovations on a project, either in design or construction, it is necessary to have adequate experienced staff to review and consider the applicability of these solutions to a specific situation. UDOT expressed concern that experienced design and construction personnel are needed to evaluate proposals in a timely and appropriate manner. These types of individuals are needed through the construction period to address construction related changes not encountered during the design phase. Similar personnel from the contractor are also necessary to address construction issues. This becomes a staffing issue on long-term projects that should be addressed in the proposals.

## **CHAPTER 4**

### **THE USE OF PARTNERING ON THE I-15 DESIGN/BUILD PROJECT**

#### **INTRODUCTION**

This report is a review of the partnering process used in the I-15 Design Build Project by Wasatch Constructors and Utah Department of Transportation (UDOT). This report is divided into sections, which address various issues identified during this review. At the end of this report conclusions and lessons learned are presented.

Partnering is essentially a formal process of setting common goals, determining objectives and resolving disputes to build a high level of trust between the many stakeholders engaged in the performance of a construction project. Its stated advantage to each party lies in its ability to accelerate the decision making process, speedily resolve conflicts and eliminate or dramatically reduce the need for litigation between parties at the end of the project.

#### **PARTNERING PRIOR TO THE REQUEST FOR PROPOSAL**

In 1993, Mr. Tom Warne, was the deputy director at the Arizona Department of Transportation (ADOT). His executive director assigned him the task of educating the department's employees in the advantages of partnering and to encouraging its use. Later, after becoming the executive director of the UDOT Mr. Warne continued to advocate the use of the partnering process, encouraging its use within UDOT and FHWA. When the I-15 project began he strongly recommended the use of facilitated partnering on the project. He held discussions with each proposer prior to soliciting Requests for Proposals (RFP's), sharing with each of them his vision of the project and the need for partnering. He also shared this vision and the need for partnering with his UDOT managers and staff, encouraging those chosen for the I-15 project to implement the partnering process. Each of the contractors indicated that they wished to use partnering on this project. The successful contractor, a consortium known as Wasatch Constructors, elected to use partnering on the project and enthusiastically supported this concept. To assist in developing the image of a partnership everyone involved in the project, both owner and contractor, was branded as part of the "I-15 Team" in order to reduce barriers and foster a spirit of unity.

#### **PARTNERING ORGANIZATION**

A Project Board of Directors (BOD) was established once the contractor, Wasatch Constructors, was chosen and the contract signed. The BOD was composed of the top-level management of UDOT and Wasatch, which included the principal partners of Kiewitt, Granite and Washington Construction. UDOT's executive director, Tom Warne was chairman and Al Kirkwood, Vice President of Kiewitt was the sponsor. (See the following chart)

## **Project Board of Directors**

### **UDOT**

Tom Warne (chairman)  
Clint Topham (later John Njord)  
David Downs (later John Bourne)  
John Bourne (later Dal Hawks)

### **FHWA**

Mike Ritchie (later David Gibbs)

### **FACILITATOR**

Chuck Cowen

### **WASATCH CONSTRUCTORS**

#### **Kiewitt Construction**

Al Kirkwood (sponsor)

Bill Murphy

Larry Cochran

#### **Granite Construction**

Dick Lewis

Gary Higden

#### **Washington Construction**

Tony Ferruccio

Wasatch Constructors was then asked to choose the facilitator to facilitate all of their meetings and run the partnering program. Chuck Cowen, a former ADOT director, was chosen and both UDOT and Wasatch equally split the cost of his services.

The first partnering meeting, facilitated by Chuck Cowen, was composed of the BOD, the three UDOT project segment managers, the UDOT team managers of ATMS (Automated Traffic Management System), Contract Administration, Pavements, Public Information and Design and the contractor's counter parts to UDOT. The product of this meeting was the I-15 Reconstruction Partnering Charter, which was signed by all team members on May 6, 1997. The one page overall project charter contained the common goals of safety, quality, schedule, budget, performance and teamwork which all partners signed and agreed to support below. This charter is shown on page 3.

The Board of Directors met every two months for the duration of the project to discuss issues, review the schedule and tour the project. As an aid in building and sustaining a relationship they always shared meals and eaten together, splitting the cost of the meetings between UDOT's and the contractor.

Due to the many critical issues concerning railroad crossings a partnering session was also held with the Union Pacific Railroad (UPRR) with the cost being split between UDOT and the UPRR. With 120 crossings the session initially helped the project in addressing the potential conflicts at those crossings. This partnering effort was very successful at the start of the project. However, the partnering process with UPRR was not emphasized for the entire duration of the project. UDOT managers felt that it would have been useful to continue the partnering efforts with the UPRR throughout the project because there were times, later in the project, when the process would have been helpful.

It soon became apparent, based on expense and logistics that Chuck Cowan would not be able to conduct all the partnering sessions planned so he was retained on a part time basis. A facilitator, Pat Crooks, was hired by the BOD team to be the full time project facilitator. In order to reduce the appearance of bias her salary was paid half by UDOT and half by Wasatch Constructors.

## **CHARACTERS AT EACH LEVEL**

Below the executive and sponsor level, each of the four operating levels of the project's management formed partnering teams and held a facilitated partnering session. At the first session a charter for each team was developed, based on the overall charter of the project. Afterwards monthly meetings of each level's team were held to resolve conflicts and problems. However, either party could call a special partnering meeting at any time if the need arose. An example of a segment operating level charter is shown on page 5. Each segment developed their own.

## **PARTNERING PROCESS**

### **ESCALATION LADDER**

To aid in the resolution of disputes an escalation ladder was established for each work segment and team. If a dispute arose that could not be resolved at that level it was elevated to the next level of management. The hierarchy for dispute resolution ran from the task force or field level, where most issues were resolved, to the second level, the design manager level. The third level up was the deputy project director level, then the project director level, then to the UDOT executive director and contractor sponsor level and finally, if necessary, to the top of the escalation ladder, the Dispute Resolution Board (DRB). Along with the escalation ladder a timetable was developed for how long a dispute was allowed to remain unresolved before it was automatically elevated to the next level of authority for resolution.

The Dispute Resolution Board was composed of three members. One member was chosen by UDOT (Burke Peterson), another by the Wasatch Constructors (Bill Peckham) and the last, a neutral and unbiased person (Ben Dibble), was mutually chosen by the other two BRD members. The DRB met quarterly for the duration of the project and was brought up to date on the project's progress at each meeting. From the beginning Tom Warne of UDOT and Al Kirkwood of Kiewitt agreed to not involve lawyers in resolving disputes and gave the DRB final say in all matters. During the entire project the DRB had only one issue brought to it for resolution. This issue concerned OCIP (Owner Controlled Insurance Program) coverage of an offsite trucking-company delivering materials to the site.



**UDOT/ Wasatch Constructors, J.V.**  
**I-15 Reconstruction Project – Downtown Segment**  
**Partnering Charter**

**Revised March 1, 2000**

We the partners commit individually and as a design/build team to the successful reconstruction of the I-15 Downtown Segment. We will achieve this through mutual trust and by communicating openly, honestly, and respectfully in the best interest of the Project. We will work proactively to prevent issues from impacting our project. As one team, we will remain focused on our common goals.

**SAFETY**

Safety first and always  
Zero tolerance for unsafe acts and unsafe conditions  
Everyone is responsible; never walk past an unsafe act or condition  
Respect our adjacent neighbors  
Focus on protecting the traveling public  
Respect the environment

**QUALITY**

Each person takes responsibility for their work  
Achieve quality as a team by seeking continuous improvement  
Do it right the first time  
Respect and confidence in the QC group  
Take personal pride in our work

**SCHEDULE**

Beat target completion of July 15, 2001  
Mainline open to traffic by May 15, 2001

**BUDGET**

Coordinate resources for the benefit of the project  
Understand that all parties have a cost  
Do not do anything to create unnecessary cost

**PERFORMANCE**

Achieve 100% of the Award Fee

**TEAMWORK**

Communicate, understand and strive to fulfill each other's expectations  
Resolve issues in a fair and timely manner  
Remain focused on the long-term goals

By accomplishing these goals we will establish a model and standard for future projects, justify the confidence that the community leaders and the public have entrusted with us, build enduring friendships, professionally develop our people, and take pride in a job well done.

## **MEETING FACILITATION**

For each partnering meeting, below the BOD level, the full time facilitator, Pat Crooks, kept track of the issues lists from the monthly evaluation forms, scheduled the meeting, developed an agenda with the aid of the team members, facilitated the meeting and took notes. After the meeting she would write up the minutes, develop a list of action items for the next meeting and distribute the minutes and action items to each team member. The action item list was especially useful for it encouraged people to make comments during the meetings and take action after the meetings.

Every person interviewed cited that the full time facilitator was essential to the success of the partnering process and thus the successful completion of the project ahead of time and under budget. Also, the formal, facilitated partnering process encouraged communication and feed back and provided an open forum to work out problems and handle concerns. The full-time facilitator also ensured that the process continued and that someone championed the process for the duration of the project. This became more important the longer the project lasted. Without this constant emphasis it would have been easier to skip some or all of the process.

## **PARTNERING EVALUATIONS**

During the first partnering sessions, at each management level below the BOD, partnering evaluation forms were developed which were filled out on a monthly basis. Essentially these forms were developed from the list of goals found in the partnering charter for a particular management level. The forms covered categories such as communication, cooperation, the response to issues that were raised, safety, quality, schedule, budget, performance, teamwork and the escalation process.

Using these forms all team members rated the various categories monthly, on a scale from one to five, with five being the highest score. Comments justifying the scores were required for all scores less than four. Thus a score of 3 or less was used whenever an issue of concern arose that needed addressing by the group's leadership. Although not mandatory, comments were encouraged for scores of 4 or 5 as well.

The evaluations could be confidential, although it was recommended that they not be, so that direct communication could take place between the individuals concerned in an issue. However, anonymity allowed people the chance to more openly express themselves on touchy issues. Each month Pat Crooks who reviewed the evaluation data and entered it into the database collected the completed evaluation forms. The data and comments were effective tools that would identify problem areas that could then be addressed in the next partnering meeting. The comments were considered of greater value to the team members than the actual scoring. However, for upper management both the number scores and the comments were considered to be important. The

number scores provided a method for getting a quick overview of the overall health of the project and the comments provided background into the specifics of issues where upper management could use intervention to assist in their resolution.

In the beginning, monthly partnering evaluation meetings were held. However, it rapidly became apparent that with all of the other meetings people were required to attend, they were having too many meetings. Thus, the frequency of the partnering meetings was adjusted to every other month and when the project had been completed had been reduced to quarterly. These meetings were held even if all the ratings were four or greater there would have been a forum for issues that had either not made it into the evaluation forms or were concerns for future issues that had not occurred. Also, towards the end of the project the number scores were dropped from the scoring forms but the comments were continued and encouraged. Sample memos and forms are shown on pages 8 through 15. The design phase team used the first example and the construction phase team of the project used the second example.

## **NUTURING RELATIONSHIPS**

Since a primary objective of the partnering was to create teams, the elimination of the “them versus us” mind set and the building of trust was essential. Thus, the relationships started in the partnering process were nurtured along the way. This nurturing took many forms, such as shared lunches and dinners, celebrating project milestones, sharing in holiday festivities and activities, participating in sports or sports activities together and other social events that built an atmosphere of camaraderie and trust. When troubles arose the managers would make a conscious effort to get the team together for something social.

## **CONTINUING THE EFFORT**

After two years, at approximately mid-project, a reaffirmation-partnering meeting was held with all the partnering groups, some seventy plus people. The charter was reviewed and refined and once again signed by all the operating level team members. A copy of an example of a revised charter for one of the segments is shown on page 5.

## **PARTNERING CHALLENGES AND SOLUTIONS**

One of the problems that partnering had to overcome early on was the diverse cultures of each organization. Some people from within UDOT and Wasatch had a hard time dealing with each other as part of a team instead of as adversaries. The process of changing their minds and attitudes was accomplished with the facilitated meetings, the successes of the partnering program and, in a few instances, the direct intervention by Tom Warne and/or Al Kirkwood.

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## MEMORANDUM

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<b>TO:</b>	<b><u>Wasatch</u></b>	<b><u>I-15 Team</u></b>	<b><u>Sverdrup/DeLeuw</u></b>
	Andy Hoff	Dan Church	Gary Adams
	Tracy Martin	Don Clark	Jim Dodson
	Bill Martin	Ray Cook	Jim Klemz
	Tom Howell	Craig Frisbee	Dave Korpi/P. Bott
	Jerry Porter	K.N. Gunalan	Gary Robinson
	Pat Soderberg	Gene Kammerman	Steve Shive
	Bruce Wilson	John Leonard	Tony Stirbys
	John Wise	Pete Marshall	Jiri Vitek
	Marwan Farah	Del Miller	
		Dave Nazare	
		Mike Robertson	
		Si Sakhai	
		Matt Sibul	
		Mike Arambula	

**FROM:** Pat Crooks, Partnering Coordinator

**DATE:** October 12, 1998

**RE:** MONTHLY PARTNERING EVALUATIONS - Design Group

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Attached is the October Partnering Evaluation for the Design Group. We need your participation to measure how well the Team is doing. Everyone's input is valuable!

**When responding, please read the full goal statement and comment on your scope within the Design Group. Do not rate on what is happening outside of Design.**

There have been several questions raised on how to use the 1-5 scale when rating. A score of 4 would mean that everything is okay - there are no specific issues or concerns you want to raise or comment on, and there is still room for improvement. A score of 3 or less would be appropriate when you have issues or concerns that you want to have addressed by the group's leadership; a score of 3 or less needs to be accompanied by a comment. We also appreciate comments on ratings of 4-5 so we can understand your rating.

<p><b>Please complete your evaluation and <u>return it no later than Friday, October 16, 1998.</u> The 2<sup>nd</sup>, 13<sup>th</sup> and 21<sup>st</sup> person to turn their evaluation in will receive a gift - will it be you???? Last months winners were Jerry Porter and Bruce Wilson. The 3<sup>rd</sup> prize was not awarded because we only received 22 responses.</b></p>
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Fax or mail to the attention of:  
Pat Crooks  
Wasatch Constructors

**Guidelines For Preparation and Review of  
Monthly Partnering Evaluations**

**The purpose of the monthly partnering evaluation is to provide a means for all levels of managers on the project to communicate their thoughts, concerns and insights to senior management on a routine basis. Everyone's concerns and opinions are important and need to be heard and acted upon as appropriate.**

**When completing the evaluation form the response is from commenting on "budget" would probably respond in the context of the subcontractors budget; however, if he has insight on impacts to the point of view of the person evaluating. For instance, a subcontractor the overall project budget, those comments would also be appropriate. The focus and comments can be as broad or narrow as the individual desires.**

**Written comments are particularly important as they provide senior management more insight as to the specifics of the issue. This is why we ask for comments on ratings of 3 or less. The expectation is Project Managers and Sponsors will look into the issues to assist in their resolution.**

**Evaluations can be confidential although we recommend they not be so that direct communication can take place with the individual concerned.**

**Keep in mind that the evaluation is tied to the Charter we developed at the very beginning (first workshop). As honorable people, we committed to act in accordance with the Charter guidelines and work in concert to achieve the charter goals.**

**UDOT/ Wasatch Constructors**

**Design Group**

**September Partnering Evaluation**

(Base responses on your experiences since the last evaluation)

FAX to (801) 594-6813

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Company: \_\_\_\_\_ Tele: \_\_\_\_\_

Representing: Owner \_\_\_\_ Designer \_\_\_\_ Contractor \_\_\_\_

**Evaluation Policy:**

Fax directly to Pat Crooks, Partnering Coordinator, or mail in a sealed internal mail envelope.

Name and telephone number are for follow-up purposes only. Confidentiality will be maintained if you do not give your permission to divulge your name. [ ] **Please check here if you do not want your name divulged to project managers for follow-up purposes.**

**NOTE: Comments are required on evaluations rated 3 or less and appreciated on ratings of 4-5 so we can understand your rating.**

**1. Communication between the Owner, Designer, and Contractor is:**

Poor            1                      2                      3                      4                      5                      Excellent

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**2. Cooperation between Owner, Designer, and Contractor is:**

Poor            1                      2                      3                      4                      5                      Excellent

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**3. When issues are raised, the response is:**

Slow            1                      2                      3                      4                      5                      Timely

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**We are successfully meeting our project goals:**

**4. SAFETY. Meet RFP design requirements as supplemented by design criteria requirements for both temporary and permanent construction.**

Not at all      1                      2                      3                      4                      5                      Absolutely

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NAME: \_\_\_\_\_

(Design Group)

**5. QUALITY. Meet or exceed the design requirements of the RFP and proposal. Obtain design approval for each final package with first submittal. Minimize the need for field design changes. Implement design program that complies with ISO 9001 certification.**

Not at all      1                      2                      3                      4                      5                      Absolutely

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**6. SCHEDULE. Target design completion November 30, 1998. Deliver “release for construction” package to meet construction milestones.**

Not at all      1                      2                      3                      4                      5                      Absolutely

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**7. BUDGET. Complete design at below the target price. Beat target quantities by 5%.**

Not at all      1                      2                      3                      4                      5                      Absolutely

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**8. PERFORMANCE. Achieve 100% of award fee for design elements. Quality - Management**

Not at all      1                      2                      3                      4                      5                      Absolutely

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**9. TEAMWORK. Have a professionally rewarding experience. Develop a work environment based on respect trust and cooperation. Maximize Owner/Designer/Constructor collaboration for design solutions. Fair and timely issue resolution. Work together to meet construction segment expectations.**

Not at all      1                      2                      3                      4                      5                      Absolutely

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**10. Are you using the process to escalate unresolved issues to the next level in a timely manner?**

Not at all      1                      2                      3                      4                      5                      Absolutely

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**MEMORANDUM**

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<b>TO:</b>	<b><u>Wasatch</u></b>	<b><u>I-15 Team</u></b>	<b><u>Sverdrup/DeLeuw</u></b>
	Tracy Martin	Dan Church	Doug Lattin
	Bill Martin	Ray Cook	John Terry
	Tom Howell	K.N. Gunalan	Steve Shive
	Jerry Porter	Pete Marshall	Cheryl Hersh
	Pat Soderberg	Del Miller	Steve Hankins
	Bruce Wilson	Dave Nazare	Michael Bloomquist
	Jim Jewell	Scott Palmer	Von Larson
	Ryan King	Si Sakhai	Al Needham
	Kristin Hemenway	Matt Carter	Bill Turner
		Will Reeves	

**FROM:** Pat Crooks, Partnering Coordinator

**DATE:** March 9, 1999

**RE:** **MONTHLY PARTNERING EVALUATIONS - Post Design Services Group**

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Attached is the March Partnering Evaluation for the Post Design Services Group. We need your participation to measure how well the Team is doing. Everyone's input is valuable!

**When responding, please read the full goal statement and comment on your scope within the Design Group. Do not rate on what is happening outside of Design.**

There have been several questions raised on how to use the 1-5 scale when rating. A score of 4 would mean that everything is okay - there are no specific issues or concerns you want to raise or comment on, and there is still room for improvement. A score of 3 or less would be appropriate when you have issues or concerns that you want to have addressed by the group's leadership; a score of 3 or less needs to be accompanied by a comment. We also appreciate comments on ratings of 4-5 so we can understand your rating.

<p><b>Please complete your evaluation and return it no later than Friday, March 12, 1999. The 5<sup>th</sup>, 11<sup>th</sup>, and 17<sup>th</sup> person to turn their evaluation in will receive a gift - will it be you???? Last months winners were Jerry Porter and Guna.</b></p>
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Fax or mail to the attention of:  
Pat Crooks  
Wasatch Constructors  
Fax # (801) 594-6813



## **Guidelines For Preparation and Review of Monthly Partnering Evaluations**

- The purpose of the monthly partnering evaluation is to provide a means for all levels of managers on the project to communicate their thoughts, concerns and insights to senior management on a routine basis. Everyone's concerns and opinions are important and need to be heard and acted upon as appropriate.
- When completing the evaluation form the response is from the point of view of the person evaluating. For instance, a subcontractor commenting on "budget" would probably respond in the context of the sub-contractor's budget; however, if he has insight on impacts to the overall project budget, those comments would also be appropriate. The focus and comments can be as broad or narrow as the individual desires.
- Written comments are particularly important as they provide senior management more insight as to the specifics of the issue. This is why we ask for comments on ratings of 3 or less. The expectation is Project Managers and Sponsors will look into the issues to assist in their resolution.
- Evaluations can be confidential although we recommend they not be so that direct communication can take place with the individual concerned.
- Keep in mind that the evaluation is tied to the Charter we developed at the very beginning (first workshop). As honorable people, we committed to act in accordance with the Charter guidelines and work in concert to achieve the charter goals.

**UDOT/ Wasatch Constructors  
Post Design Services Group  
March Partnering Evaluation**

(Base responses on your experiences since the last evaluation)

FAX to (801) 594-6813

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Company: \_\_\_\_\_ Tele: \_\_\_\_\_

Representing: Owner\_\_\_\_ Designer\_\_\_\_ Contractor\_\_\_\_

**Evaluation Policy:**

- Fax directly to Pat Crooks, Partnering Coordinator, or mail in a sealed internal mail envelope. Name and telephone number are for follow-up purposes only. Confidentiality will be maintained if you do not give your permission to divulge your name. [ ] **Please check here if you do not want your name divulged to project managers for follow-up purposes.**

**NOTE: Comments are required on evaluations rated 3 or less and appreciated on ratings of 4-5 so we can understand your rating.**

**1. Communication between the Owner, Designer, and Contractor is:**

Poor            1                    2                    3                    4                    5                    Excellent

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**2. Cooperation between Owner, Designer, and Contractor is:**

Poor            1                    2                    3                    4                    5                    Excellent

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**3. When issues are raised, the response is:**

Slow            1                    2                    3                    4                    5                    Timely

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**We are successfully meeting our project goals:**

**4. SAFETY. Meet the design requirements when executing FDCs for both temporary and permanent construction and in the use of existing facilities.**

Not at all      1                    2                    3                    4                    5                    Absolutely

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**5. QUALITY. Meet or exceed the I-15 design requirements. Perform post design program that complies with ISO 9001 certification, the DQMP and CQMP.**

Not at all      1                    2                    3                    4                    5                    Absolutely

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NAME: \_\_\_\_\_ (Design Group)

**6. SCHEDULE. Deliver FDC packages and submittals to meet construction schedule.**

Not at all      1                      2                      3                      4                      5                      Absolutely

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**7. BUDGET. Cooperate to maintain a cost efficient process. Provide resources commensurate with schedule and scope being provided.**

Not at all      1                      2                      3                      4                      5                      Absolutely

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**8. PERFORMANCE. Achieve 100% of award fee for design elements in the quality criteria.**

Not at all      1                      2                      3                      4                      5                      Absolutely

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**9. TEAMWORK. Have a professionally rewarding experience. Develop a work environment based on respect trust and cooperation. Maximize Owner/Designer/Constructor collaboration for post design solutions. Fair and timely issue resolution. Work together to meet construction segment expectations.**

Not at all      1                      2                      3                      4                      5                      Absolutely

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**10. Are you using the process to escalate unresolved issues to the next level in a timely manner?**

Not at all      1                      2                      3                      4                      5                      Absolutely

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A significant challenge occurred early in the partnering process that threatened the success of the project. The issue centered on the contractor's use of materials, products and procedures that were different than those in UDOT's specifications or what the contractor had submitted in the original proposal. UDOT's opinion was that the substitution of these materials, products and procedures constituted a change order and needed to go through the formal change order process, where a change in cost or time or an added value to the state would be the only basis for deciding whether or not a change would be granted. The contractor's opinion was that the materials, products and procedures spelled out in the specifications and in their submitted proposal were only a best guess of what to use, based on minimal information and a minimal design effort. Thus, when different conditions than those anticipated arose the aforementioned documents were not binding and thus a change order to modify them was not required. The contractor was also concerned about the large amount of time the change order process could take and the significant impact it would have on the project's schedule. As the result of a partnering session on January 30, 1998 the first Memorandum of Understanding (MOU), which permitted the substitution of equal or better products or procedures without a change order, provided the material, method or product to be substituted was as good or better than the original, was signed. A copy of this memorandum is shown on page 17.

One person, the UDOT deputy project director, would make the decision, as to whether a product to be used was as good or better than the original. This, rather than a Change Board Group, was used in order to keep the process rapid. The issue was resolved using a facilitated meeting and the principles of partnering and was a defining moment in the success of the partnering process and the project.

At times significant issues would be encountered that required bringing in outside experts. Each party would bring in experts at their own expense to address the issue or if agreed to they would split the cost of bringing in experts between them. The discussion and final resolution of the conflict was determined in a facilitated meeting. A determination was usually made up front to abide by the conclusions of the third party experts.

The agreed time period before escalation to the next level was not always adhered to. It was difficult for people to get over the feeling of failure they felt in escalating a problem to the next level of management or in some cases the fear of looking bad to their superiors. This caused them to hang on to a problem longer than the time limits agreed to in the escalation ladder document. On the other hand, on a few occasions, the upper management level felt that insufficient time or effort had been invested in solving the problem before it was escalated. On these occasions the problem was moved back down the ladder for further discussion at the lower level. Once an issue got to the Executive Director level the decision made was generally based on a business decision. Tom Warne commented, during an interview, that more explanation by the higher levels on their reasoning in making the decisions would have helped eliminate complaining and aided people in accepting the decisions and moving forward.

The \$ 50 Million dollar award fee was an area of contention. From UDOT's point of view the award fee was a reward for work done well and on time while from the contractor's point of view it was money in the contract that was theirs and could only be taken away for poor performance or late work. This basic philosophical difference in how the awards fee was viewed persisted throughout the project.

It was suggested by the Contractor that the award fee was counter to the concept of partnering and was a throw back to the “catch and punish” philosophy encountered in typical highway construction. The UDOT Project Director, however, was a strong advocate. In the end, 99% of the award fee was paid out.

## **LESSONS LEARNED**

**Commitment to Partnering.** It is essential, especially in the beginning of a project as large as this one, that the upper management commits to the partnering process and that they invest significant time, training, and coaching at lower levels getting buy-in. For those new to partnering the inertia of how things have always been done is difficult to overcome. This was especially common in the construction inspection area where the typical concept of “catch, stop work and punish” was replaced with observe, inform, and partner the problem. Since there was no stopping the project all conflicts had to be worked out quickly and efficiently as the work continued. The commitment of the top managers of both UDOT and Wasatch to partnering was arguably one of the most significant reason the project was a success.

**Internal Partnering Meetings.** Participating in internal partnering was needed to help people understand the concepts better before engaging in partnering with people outside of their organization. It took about six months of partnering before the various groups pulled together as one cohesive team. Also, moving people into and out of the project was a hardship since it took awhile for the new people to become acquainted and comfortable with the partnering process and the team.

**Designer Involvement in Board of Directors (BOD)** Designers were not intimately involved at the BOD level of the project. UDOT felt that designers needed to be more heavily represented on the BOD, especially early in the project. Though other people were invited to the BOD meetings as was deemed necessary only one board member represented all of the various design disciplines at the BOD meetings for the duration of the project.

**Escalation Time Limits.** The escalation process time limits need to be closely followed in order not to slow the progress of the project. Upper management needs to convince everybody that the escalation of a problem is not going to be viewed as a failure and that they have nothing to fear from elevating a problem provided they have made a good faith effort to solve the problem at their level.

**Need to Follow the Escalation Process.** It needs to be consistently communicated that there is to be no skipping of rungs on the escalation ladder otherwise the formal process will break down and people will feel that their prerogative to make decisions on their level has been denied.

**Need to Provide Rationale for Designs Made at Higher Levels.** Decisions made at a higher level need to be communicated and explained to the lower levels in order to keep up morale and achieve “buy-in”. This is especially important when the decision is based on business decisions rather than the technical merit of the issue. It will also demonstrate the support and consideration of higher-level management for their own personnel.

**Partnering Empowerment.** The partnering process empowered people to take responsibility and make decisions at the lowest levels possible. People learned to take more reasonable approaches to solving problems in order to prevent their decisions from being overturned at a higher level.

**Principle of “Doing the Right Thing”.** Partnering also helped to focus on doing the right thing. Looking at what is best for the project became the first priority. Next was looking at the contractual requirements of the issue. This was all done with the schedule and cost restraints in mind, which provided good solutions to issues and kept the project on schedule and under budget.

**Review Charter Often on Long-term Projects.** The partnering charter needs to be looked at periodically and changed as necessary. This should be done at least yearly for the life of a long-term project. This re-chartering not only keeps the document a viable, living guideline but also has the added benefit of reenergizing all of the team members. Also, every six months a refresher partnering session was held that lasted half a day. This had the added benefit of reenergizing the team.

**Co-location of Owner/Contractor.** Co-location of UDOT and the Contractors turned out to be a great benefit. It promoted good, fast communication, helped build the feeling that everybody was on the same team and aided in the rapid solution of problems. Also, the interaction of the contractors with the designers during the design phase led to the development of plans which were easier to construct.

**The Importance of Formalizing the Process.** The formal issue resolution process of regularly scheduled meetings worked well because it identified a counterpart, by name, for each project role. Thus each person knew who to go to for the resolution of issues. It also made negotiations easier because they had to spend time with their counterpart getting to know them. These meetings forced people to sit down face to face and discuss the issues.

**Emphasize Professional Interactions.** Sometimes the evaluations or issues upset people, which essentially was a personality problem. However, it needs to be agreed to in the beginning to treat each other with professionalism and courtesy and to employ tact in all communications and dealings. This was not a significant problem on this project but the potential was recognized.